

A SIMPLE, EFFECTIVE AND CHEAP BAITED PITFALL DESIGN

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Baited pitfall traps are recommended for capturing specialist terrestrial invertebrates (Cooter, 1991; Cogan & Smith, 1974) but most designs include the bait and preservative within one container. The nature of this design leaves it vulnerable to disturbance by foraging animals, frequently resulting in a loss of specimens and effort. In addition the resultant samples are usually contaminated with bait. J. H. Keys in his notebook, held at Plymouth Museum, describes success in Devon using "carriion bottles" but makes no mention of the practicalities. Having found many of my carriion traps disturbed or with contaminated samples, a more robust and hygienic design was required.

During the spring of 1996 a baited pitfall trap design was created and tested. The requirements were for a relatively weatherproof design, resistant to disturbance by dogs, foxes and other vertebrates, and to provide clean, hygienic samples. The trap was initially designed for use with a carriion bait such as fish, but proved effective with a liquid bait where a fermenting mixture was used.

Several designs were attempted but the most successful consisted of a 2-litre plastic drink bottle suspended approximately 5 cm above the ground with a number of uncovered pitfall traps set below it. The plastic bottle possessed a rimmed neck which was attached by tough string to an overhanging object such as a branch. An arch was cut in the top third on one side of the bottle, this produced an elongate flap attached by its base to the bottle. This flap was resistant to manipulation but could be bent back to aid with the insertion of bait. About half way up the bottle a ring of punctures allowed some airflow through; this hopefully was exaggerated when the bottle swung in the wind. The free movement of the bottle was essential to the design. Any attempt by an animal to get the bait would be hampered by the lack of leverage onto the plastic bottle.

Below the baited bottle the pitfall traps consisted of plastic cups with rims set flush with the ground and partially filled with a 50% ethylene glycol solution and a few drops of detergent (washing up liquid). The ethylene glycol solution was diluted from concentrated (c. 97%) car antifreeze purchased locally, it was dyed blue. This preservative was diluted to a relatively strong solution to counteract rain dilution. Only occasionally were the traps disturbed and the contents lost due to animals. Initially ten traps were set under each bottle but later five or six pitfalls produced similar quantities of material. At one site all the pitfall traps were pulled up on several occasions. This was rectified by the addition of a very large pinch of extra hot chilli powder to each trap; this did not seem to affect the specimens collected. I suspected that pheasants were the culprits as I had seen them pecking at the traps previously; however the chilli powder solved the problem.

In the spring of 1996 ten traps were set, some isolated and others amidst busy public areas; all but two were intact on return. The two casualties were in busy public areas and were probably tidied up as the bottles were nowhere to be seen, the string cut and the concealed pitfalls intact. In some cases the traps lasted in public areas for over a month. The use of clear bottles and the need for overhanging branches was advantageous in that the traps were well concealed. The traps were successful at attracting several unusual species and good value considering the low cost and effort of setting them up.



The traps double as effective pitfall traps as well as capturing those species attracted to the bait. The fermenting fruit bait consisted of partially liquidized leftover fruit (melon, apple, banana) from the grocers, left for at least a week in a sealed container and with sugar and half a sachet of baker's yeast added prior to taking out into the field. This bait was particularly effective in attracting *Dorcus parallelipipedus* (L.), *Carabus violaceus* L., *Carabus problematicus* Herbst, *Carabus nemoralis* Müller, *Carabus granulatus* L., *Carabus intricatus* L., as well as occasional *Serica brunnea* (L.) and one individual of *Trypodendron domesticum* (L.).

The carrion bait consisted of fish heads from the local fishmongers or chopped waste bones from the butchers. This bait was successful in attracting carrion and dung beetles such as *Necrophorus humator* F., *N. vespilloides* Herbst, *N. vespillo* L., *Necrodes littoralis* L., *Oeceptoma thoracica* L., *Thanatophilus rugosus* L., *Omosita depressa* L., *O. discoidea* F., *Onthophagus coenobita* (Herbst), *Geotrupes stercorosus* (Scriba), *G. spiniger* (Marsh.), *Typhaeus typhoeus* (L.), *Creophilus maxillosus* L., *Saprinus aeneus* (F.), *Margarinotus striola* (Sahlb.), *M. cadaverinus* (Hoffm.), *M. carbonarius* (Ill.) and *Laemostenus terricola* (Herbst).

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